

Seven Ambitious Brothers
and How They Bred
a Race of Kings

The First
of a Series of Monographs
on the Improvement of
the Human Plant

HENRY SMITH WILLIAMS, M. D., LL. D.
Editor

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FOREWORD

Heredity is more of a factor in human life than in plant life—more of a menace—more of a hope.

And nothing in the world of living things responds so quickly to new environment as the human mind—child and adult.

The great value of Luther Burbank's work lies in blazing the path to the application of the forces of heredity and environment to the improvement of the human plant—to the production of better races, better nations, better communities, better families, better individuals.

Having completed the classification of Mr. Burbank's Records as applied to plant life, The Luther Burbank Society now proceeds to the larger task of interpreting the forces of heredity and environment toward the betterment of the human plant through a series of monographs, the titles of which are given on the last page, the first of the series appearing herewith.



SEVEN AMBITIOUS BROTHERS --- AND
HOW THEY BRED A RACE
OF KINGS

IT IS worth much, by plant eugenics, to breed the spines from the cactus and thus, at one stroke, rid the world of a plant enemy and give it a new plant friend.

But it is worth more, who shall say how many times more, to breed strength of mind or strength of body into a child—to breed out those qualities which might make the child a menace and to breed in those which make him a useful citizen and a successful individual.

It is the purpose of this series of monographs to deal with the subject of race betterment and self-betterment through the application of the laws of heredity to mankind—to study Luther Burbank's amazing success in plant eugenics with an eye towards its application to the practice of human eugenics.

Fitly to introduce the subject, let me tell the story of how, through the practice of eugenics, an obscure German bishop became the father of kings.

It is a story with all the elements of romance, but it is sober history.

At the outset, the tale concerns seven brothers who, along in the sixteenth century, inherited a small ducal estate on the borders of the Black Forest. The estate included the free Hanseatic city of Lüneburg, and was large enough to have some significance in German politics if undivided. But the brothers realized that if each were to claim a share in the estate its divided fragments would have little importance either severally or collectively.

The brothers were all talented and ambitious men, but they had a sense of family obligation that took precedence over their several ambitions. So they held a family conclave and decided that only one of their number should marry. The lot fell on the sixth brother, who accordingly chose a wife and in due course had a family of children. The remaining brothers worked and warred in the interests of the family estate with no reward except the consciousness that they had added prestige to the family name.

The children of the sixth brother made among

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themselves the same compact that their father and uncles had made. The duty of transmitting the family name devolved upon one Ernest Augustus, Bishop of Osnabruck. In that day an ecclesiastic might be a warrior as well, and the growing influence and success of the Bishop of Osnabruck enabled him to win for his wife a very extraordinary woman, Sophia of Palatine. The son born of this union inherited the original estate with sundry accretions, and his mother believed him destined for great things.

But a brother of the Osnabruck Bishop had broken his compact and also married, and he had a daughter, whose advent brought consternation to the family. Sophia of Palatine never forgave her niece for being born; but she solved the dilemma by marrying her own son to said offending niece, his cousin. So the family interests were again united.

Thus it appears that the family of the seven ambitious brothers was a dwindling company in the two generations that succeeded their compact,—and expressly because of their compact. In modern terms this seems a case of race suicide. But it may properly be interpreted in a yet more modern phrase.

What the ambitious brothers and their successors had done was to practice the art of eugen-

ies in three important phases.

They had (1) restricted the number of descendants, through preventing the birth of supernumerary children; (2) they had wisely selected able mates for the procreating member of the family; (3) and they had concentrated the family estates and talents by judicious inbreeding—that is to say by the union of cousins.

Now note the sequel of this remarkable practice of eugenic principles. The son of the erstwhile Bishop of Osnabruck and his brilliant wife became King of one country (George I of England), and their daughter became Queen of another (Sophia Charlotte of Prussia). Their direct lineal descendants to-day occupy the thrones of England, Germany, Russia, Denmark, Norway, Greece, and numerous minor principalities. As a direct sequel of that conclave of the seven ambitious brothers, their little estate became the cradle of monarchs. The self-abnegation practiced by the six brothers bore fruit that exalted their family from the control of a petty dukedom to the rank of kings and emperors.

And it was no blind chance that brought about this extraordinary advancement. It was the conscious application of laws of heredity which are followed all over the world in the breeding of domestic animals, but which have been for the most

part ignored in breeding men. To-day the word eugenics is heard on every side and the idea for which it stands is in the air. It is a new word, and most people perhaps suppose that the idea is also new. But this is fallacious. I have cited the case of the seven brothers—a perfectly authenticated historical case which will further claim our attention in a later monograph—to give tangible illustration of the fact that practical eugenics as applied to the human race is no new art.

The new thing is merely that nowadays we should begin to think it worth while to apply this art to humanity in general, whereas hitherto it has been reserved for the breed of kings.

NEW KNOWLEDGE FROM PLANT BREEDING

It is true, however, that we have gained in recent years a great deal of precise knowledge as to the laws of heredity and as to their practical application. In particular it has come to be recognized more and more fully that the same laws of heredity apply to all living creatures, and that correct inferences may be drawn from observation not merely of lower animals, but also of plants, as to the application of the laws of heredity to humankind.

This is peculiarly fortunate because plants offer in many ways better opportunities for obser-

vation than do animals. The fact that plants may be grown in enormous quantities, often maturing in a single season, gives opportunity for conducting experiments on a comprehensive scale, and sometimes for the discovery in the course of a few years of laws that might have required long periods for their elucidation had observation been confined to the direct breeding of the human race, or even to the breeding of animals.

Everyone is aware that Luther Burbank has conducted experiments in plant breeding on a more comprehensive scale than any other experimenter, and that he has operated with a large number of individuals. His work has had to do with members of the vegetable kingdom of every type, and he has ceaselessly carried out his experiments, seldom having less than three thousand different ones under way, year after year, for a period of almost half a century. Naturally he has accumulated a vast fund of information, and this is about to become available to the general public and to plant breeders through the official publication of his methods and results.

I have had opportunity to study the entire record of Mr. Burbank's work in manuscript, and to confer personally with Mr. Burbank himself as to all its details. I have been profoundly impressed with the importance of this work, not only

in its direct bearings on horticulture and agriculture, but in its application to the breeding of the human plant—a subject, it may be added, in which Mr. Burbank himself is intensely interested. It has seemed worth while to suggest in detail the application of Mr. Burbank's methods—guided always by their proved results in the vegetable world—to the question of the improvement of the human race—with particular reference always to the needs of the individual reader.

Such an attempt will be made in the series of monographs of which this is the first. I have thought that the pertinency of the topic, and its practical possibilities, might perhaps be emphasized by citing at the outset the authentic anecdote of the seven brothers who with rare prevision, more than two centuries ago, forecast the Burbank methods in some at least of their most important applications, and in so doing exalted their family to the foremost place not merely in one nation but in many nations. With this family of king-makers we have no further present concern; but we shall have occasion to examine their pedigree more in detail in another connection, since it gives graphic illustration of certain laws of heredity that are of cogent interest to all of us.

BURBANK METHODS IN OUTLINE

In the present paper, I purpose to outline the

broader principles of the Burbank methods, with mere suggestions as to their application along various lines that will be given detailed treatment in successive monographs.

Mr. Burbank himself has very explicitly stated that the essence of his method is rational and persistent selection. In a comprehensive experiment in plant development, he (1) selects parent forms to be mated; and then (2) selects the best individuals among the progeny and if necessary remates these to bring desired characters into the hereditary strain. When the right combinations have been produced, he (3) continues to select the best individuals, generation after generation, now practicing inbreeding instead of cross-breeding that the desired traits may be accentuated by repetition.

Casual observers of Mr. Burbank's work have been impressed with the early stages of this line of experimentation somewhat to the oversight of the later stages. The hybridizing of species brought from widely different regions of the world is a somewhat more spectacular process than the continued inbreeding or "line breeding" of a given race, since the latter process seems to consist of nothing more than the selection of the best individual specimens generation after generation.

But in Mr. Burbank's opinion, this process of

line breeding through which specialized qualities are accentuated is no less important than the earlier process of cross-breeding; and in making application of the method to the human plant we must bear this constantly in mind.

SELECTION OF PARENTS

In the great majority of cases, indeed, nothing of real importance could be accomplished were the experiment carried no further than the first mating or hybridizing of the individuals selected to act as parents. Yet, on the other hand, right selection here is the condition of all future success.

Some of Mr. Burbank's most striking results have been attained through the hybridizing of species that were in many respects widely divergent. In particular, he brought together species from widely separated geographical territories, and thus gave opportunity for the blending of diversified racial strains.

Examples in point are furnished by the vast numbers of experiments with members of the race of plums. Almost at the outset of his experimental work Mr. Burbank imported plums from Eastern Asia, and began crossing them with various species of plums from Europe as well as those indigenous to America. Presently he had hybrid races on his experiment farm at Sebastopol that

combined the racial strains of practically all known species of plums under cultivation.

More than that, he crossed the plum with the apricot, producing thereby his wonderful new fruit, the Plumcot.

So striking have been the results of this mating of plums of diversified characteristics that more than sixty new varieties of plums, prunes, and apricots have been introduced by Mr. Burbank, constituting an extraordinary company of fruits that are revolutionizing the plum-growing and prune-growing industries all over the world. One-third of all the plums shipped from California are now Burbank plums, and the best of his new varieties are of such recent introduction that they have not as yet made their influence felt, as they must inevitably do in the course of the coming decade.

Other illustrations of hybridizing experiments through which Mr. Burbank has produced remarkable results—to mention a few almost at random—are given by his hybrid races of blackberries and raspberries, including the Primus berry, the Phenomenal berry, the White blackberry, and the Thornless blackberries; the Paradox and Royal walnuts, combining the traits of Persian walnut with those of the California black walnut in one case, and of the Eastern species of black walnut

with the Californian in the other; and in the Shasta daisy which combines the characteristics of three species originally inhabiting Europe, America, and Japan respectively.

AMERICA—THE RACIAL MELTING POT

It is obvious that here in America we are bringing together, thanks to the extraordinary immigration of recent years, representatives of the human species of many races and from all regions of the globe. In the nature of the case, these newcomers will ultimately intermingle, and thus there will be accomplished, on a broader and more comprehensive scale, some such blending of the strains of different human races as Mr. Burbank has accomplished in the case of the different races of plants.

The question naturally arises as to whether the remarkable results that Mr. Burbank has produced in developing improved races of plants are likely to be duplicated in the case of the human plant here in America. Offhand it might seem that such should be the case. But before indulging in too optimistic an augury it is well to consider two or three complications.

In the first place it must be recalled that Mr. Burbank imports only the best examples of the various species with which he experiments. He thus breeds from selected stock. But it is well

known that a large proportion of the immigrants that have come to the United States in recent years are not the best representatives of their various races. On the contrary, they include a large proportion of inferior representatives.

Without dwelling at length on the matter here, it must be obvious that this introduces a complication of more or less serious import. Mr. Burbank would not expect to improve a race of plants by introducing stock of an inferior type. As a general proposition, that seems axiomatic. But, on the other hand, it must be recalled that Mr. Burbank frequently finds it necessary to utilize a stock that is in many ways inferior, in order to take advantage of some one desirable quality of that stock.

A case in point is furnished by the new races of wonderful stoneless plums which Mr. Burbank developed by breeding from an originally wild plum of Europe which was small in size, and so acrid as to be practically inedible, but which had the essential quality of bearing a kernel with only a remnant of a stone.

This might very justly be regarded as an abnormal plum, and as a very perverted or retrogressive and altogether worthless example of its tribe. Yet its one quality of stonelessness—in itself an abnormality from the standpoint of plant

economy—was so important that the strains of this little plum have been combined with those of a great variety of the most aristocratic plums in Mr. Burbank's orchard. And it has been found possible to breed into the hybrid progeny the good qualities of the aristocratic plums, while retaining the quality of stonelessness as the only reminiscence of the vulgar and perverted ancestor.

Is it not possible, then, that the immigrants who on the whole seem of undesirable type may have racial characteristics that will advantageously blend with the traits of the American race for the betterment of posterity?

It has been suggested, for example, that the Mediterranean races have the inherent love of music and the arts ingrained in their racial stock, and that this artistic sense may remain as a permanent endowment of their descendants in America when their less desirable physical and moral characteristics have been bred out of their progeny by mingling with the better strains of the American race, somewhat as the undesirable qualities of the little stoneless plum were bred out of their progeny in Mr. Burbank's gardens, while the one desired quality of stonelessness was retained.

Obviously this possibility must modify somewhat our verdict as to the possible outcome of the great mingling of races that is taking place in

America to-day.

BREEDING FROM THE UNFIT

Let it be recalled, however, that the preponderant influence must be good if good results are to be attained. We cannot hope to assimilate too large an increment of foreign blood. More than fourteen hundred thousand immigrants came to the United States last year. Of those that came from southeastern Europe more than thirty-five per cent. were illiterate. It is a serious question whether the American stock can amalgamate so high a percentage of foreign elements without deterioration.

Another complication that cannot be overlooked is furnished by the fact that the less desirable members of the population are observed to be more prolific than are the superior members.

This obviously runs counter to Mr. Burbank's method in the development of improved races of plants; for it goes without saying that he chooses the best individuals in his plant colonies for crossing when he is endeavoring to improve a given race. Yet here again there are qualifying elements. It may be contended with good reason that the American race is a highly developed stock, so that there are elements of good in even its worst examples. One can never be sure, then, that the progeny even of individuals of undesirable traits

may not show reversion to the better strains of their ancestors.

We must recall that every individual has a vast coterie of ancestors who in the aggregate represent a great variety of traits. You can probably recall your four grandparents, for example, and a moment's reflection will convince you that they differed as to their inherent qualities. And each of them tended to transmit his or her qualities to you, their common descendant.

Still more complicated would seem your heritage if you could know your eight great-grandparents. And when you reflect that the generation back of them numbered sixteen individuals and their parents thirty-two, the case becomes still more complex.

In a word, your ancestors increase in a geometrical ratio, and at a remove of only ten generations they number more than one thousand individuals. According to the most fundamental law of heredity, each individual tends to transmit all of his or her traits, and a moment's reflection shows that the ancestral tendencies that are struggling for mastery in the germ-plasm of any individual are multitudinous.

It is obvious that many of the traits involved must be mutually exclusive, and that hence any given individual must have almost numberless

latent qualities that may never be tangibly revealed.

We shall have occasion to make fuller reference to this aspect of the subject in a moment. Here I wish merely to point out that no two individuals even of the same parentage show precisely the same combination of characters and that the probability of bringing out any given trait obviously increases with the actual number of progeny.

As a tangible illustration, Mr. Burbank has himself called attention to the fact that he was his father's thirteenth child, and that no one of the dozen children who preceded him manifested any exceptional aptitude for horticultural pursuits. There are numberless cases in history where the man of genius appears as a later member of a mediocre fraternity. So we must recognize that the full racial opportunities of any given strain are not likely to be realized if the progeny are restricted to two or three individuals in a fraternity.

At first sight, then, it might seem that the enthusiasts, who have prated about race suicide and urged on humanity in general the duty of having large families, were justified. And indeed, Mr. Burbank's method of growing vast numbers of seedlings, in order to select the best, may be said to be corroborative.

It must be recalled, however, that Mr. Burbank has the option of destroying all of his seedlings, and that he commonly preserves only a few among the thousands.

Obviously this part of the plant breeder's methods cannot be applied to the human plant, and hence we are debarred from giving indiscriminate approval to the method of quantity production as applied to human beings.

What we are justified in saying, however, is that quantity production applied to the better classes of the community would be highly beneficial. It should be remembered that Mr. Burbank applies the principle of quantity production not indiscriminately, but to the best individuals. He could never produce the improved varieties for which he is famous were he to breed only from undesirable members of the colony, even though he germinated seeds by uncounted millions.

AID FROM GALTON'S LAW

In point of fact, it is necessary, in order to gain a clear understanding of the matter, to supplement what was just said about the multiple ancestry of each individual with the explicit statement that the major part of the qualities that are likely to find expression in any given case has been tangible in the immediate ancestors.

According to an estimate made by the late

Sir Francis Galton, and hence sometimes spoken of as Galton's law, each individual inherits half his tangible traits from his parents, one-quarter from his grandparents, one-eighth from the great-grandparents, and so on in decreasing ratio.

In accordance with this rule, it is clear that only a very small portion of the tangible traits of any individual will have been inherited statistically from ancestors more remote than the great-grandparents. So in practice we are fully justified in saying that a person whose immediate ancestors are known to show a preponderance of undesirable traits has *bad* heredity, even though it can be shown that there were persons of the most commendable character among his remote ancestors.

In practice, then, it is possible for Mr. Burbank to determine pretty accurately what will be the main characteristics of the progeny of any given cross from observation of the parents and grandparents alone; yet it must never be forgotten that as regards some quality that may be vitally important there may be reversion to a remote ancestor.

The really vital question is whether, in practice, there is any definite guide as to this matter of the inheritance from remote ancestors of traits that are not manifest in the immediate ancestors.

Fortunately this question may now be answered in the affirmative. The new knowledge that makes this possible was gained primarily through the study of inheritance in plants.

Thus Mr. Burbank early discovered that when he hybridized two plants having different qualities, the progeny of the first filial generation were relatively uniform in character; but that their progeny showed a very strong tendency to variation, some of them reverting toward one parent and others toward the other, and still others showing a new combination of the traits of the parents.

It was by following up the clews thus given that Mr. Burbank was able to make many of his most important plant developments.

As an illustration, Mr. Burbank crossed a partially thornless bramble that had been discovered in the Eastern United States with the ordinary thorny blackberry, and produced a race of hybrids all of which bore thorns. But in the next generation a certain number of the progeny were thornless; and some of them combined with thornlessness the good qualities of fruit-bearing of their thorny grandparent.

On the same principle, Mr. Burbank produced his stoneless plums, white blackberries, and numerous other new plant developments.

MENDELIAN HEREDITY

The discovery that second generation hybrids tend thus to recombine the characteristics of their grandparents in new combinations has been made even earlier by an experimenter whose work for the time being was ignored, but who subsequently came to posthumous fame through the rediscovery of his work about the beginning of the present century. This was the Austrian-Silesian monk, Mendel. He had not only made independently the discovery that had meant so much in Mr. Burbank's work, but he had followed it out with numerical computations that gave him a very definite notion as to the exact way in which the divergent traits of any given pair of parents would be combined in their descendants.

Mendel's work was chiefly done with the garden pea, and he dealt with qualities that are mutually exclusive—large size versus small size, for example, in the case of the pea, or yellow pods versus green pods, or pink flowers versus white flowers.

To state the simplest case, Mendel found that when a tall race of peas is crossed with a short race, the progeny are all tall; but the quality of shortness, although for the moment suppressed, is not lost, but reappears in about one in four of the progeny of the next generation.

Mendel spoke of tallness as "dominant" in the case of the pea and of shortness as "recessive," and these terms are so convenient that they have passed into current usage. The essential thing is that the recessive trait, if its elements are present in the germ-plasm of an individual, will *inevitably* reappear in a percentage of the offspring of that individual under certain conditions; and it has been found that this fact is highly important from the human standpoint, inasmuch as there are certain human traits that show the phenomena of dominance and recessiveness in inheritance.

This is particularly true, for example, with defects of the brain and nervous system which may manifest themselves in sub-normal mentality.

There is a growing body of evidence to show that mental normality is dominant to mental abnormality, in the Mendelian sense of the word; hence that when a perfectly normal individual is mated with one of subnormal mentality, the offspring will probably be normal; but these normal offspring, carrying the mental defect as a recessive trait, if mated with other individuals of similar heritage, may have progeny about one-quarter of whom are of defective mentality.

As an illustrative example, I may cite a case that came very recently under my observation. I was asked to examine a boy of ten, who was ob-

viously abnormal, and who on examination proved to be feeble-minded. His parents were not only normal mentally, but were both persons of exceptional ability, the father being a professor in a leading university, and the mother a woman of unusual culture and of a thoroughly common-sense type of mind. Inquiry revealed the fact, however, that in the families of both father and mother were members who were mentally unsound.

This taint of defective mentality was, then, a recessive trait in the germ-plasm of both parents; so it was almost a foregone conclusion that about one in four of their progeny would show some form of mental abnormality. In point of fact there were three children, two of whom were sound of mind and of unusual ability, the third being the defective child just referred to.

It goes without saying that this man and woman, however well suited for each other in all other regards, should have been debarred from marrying by the fact that they both carried latent strains of mental abnormality in their heredity. But it is only in the most recent times that any one has understood the danger involved in such a union.

COUSIN MARRIAGES

Now that we have a clearer insight, it is

obvious that such a case as that just cited is precisely comparable to what takes place when Mr. Burbank endeavors to fix and accentuate a quality by what he commonly speaks of as line-breeding—that is to say, by the union of individuals having the same hereditary tendencies.

When, for example, Mr. Burbank discovered a specimen of the wild California plant called *Heuchera*, or “wild geranium,” that had a tendency to crinkle the edges of the leaves, he transplanted this specimen to his garden and carefully inbred its progeny generation after generation, selecting always the ones that showed the tendency of malformation of leaves, until presently he had a new race of *Heuchera* with the most curiously convoluted leaves.

He could not have produced this result had he not interbred individuals that had the peculiarity of their heredity.

And this, indeed, is the typical method, as already suggested, by which Mr. Burbank fixes and accentuates a character, once that character has manifested itself. It was thus, for example, that the scented callas and verbenas and petunias were produced; also the improved Burbank varieties of almost numberless other flowers, fruits, and vegetables.

Of course, in the case of the human parents

just referred to, the character contained in their germ-plasm was one which they desired to see eliminated, not perpetuated. But nature is quite impartial in the application of her laws of heredity. The same manner of transmission applies to desirable traits and undesirable ones. Indeed, it may be said that from the standpoint of plant economy, some of the same qualities that make Mr. Burbank's new fruits and flowers most desirable are abnormalities. A double flower, for example, is much less well adapted to propagate its kind than a single one. Yet from the standpoint of the plant developer the double condition is desirable, as it enhances the beauty of the flower.

In the case of the human subject, however, the traits are adjudged by another standard, and are considered desirable only if they conduce to the welfare of the individual and the race. So we are usually concerned with the exclusion of undesirable qualities, and it is these that have hitherto been chiefly studied by students of heredity. But the fact that some at least of these qualities are transmitted along Mendelian lines gives clues that are invaluable.

The analogy with plant experiments shows how a defective trait that acts as a recessive factor in inheritance—any mental deficiency or susceptibility to tuberculosis—may be ingrained in a fam-

ily and result disastrously. But, contrariwise, this same knowledge points the way to the elimination of such a defective strain.

Just as Mr. Burbank could not fix the abnormal quality of his wild geranium leaf without inbreeding, so the defective quality in the human subject is not likely to be fixed unless a person having the defect mates with another having a similar defect.

And this gives us a clew to a full understanding of the question of cousin marriage, regarding which there has been a good deal of difference of opinion among students of heredity in the past. In the light of the new knowledge it would appear that there is no necessary danger in such unions provided there is no defective strain in the family.

On the contrary, a desirable quality, even genius itself, may be thus accentuated, as we saw illustrated in the case of the family of the seven brothers.

If, however, a defective strain exists, the marriage of cousins brings together the two defective elements in precisely the way best suited to make them tangible in the offspring.

The practical lesson is that if there is a strain of mental defect or of susceptibility to tuberculosis—to name only two important conditions—

in your family, it would be unwise for you to marry a cousin, although such a union might otherwise be not undesirable. The same objection applies to the union of individuals who have the same defect.

Thus it appears that the new knowledge of heredity does not necessarily tell whom you should not marry. It is believed that a knowledge of Mendelian heredity will serve as a guide to intelligent couples in future, and that the happiness of the individual and the welfare of the race will thereby be vastly enhanced.

A fuller treatment of this aspect of the subject will of course be given in a later monograph of the present series.

NURTURE VERSUS NATURE

While important benefits for the race may thus be expected to accrue from the application of the laws of heredity, it will still remain true that environment must have a large share in determining the ultimate fate of the individual, and hence in gauging the average status of the race.

As to this aspect of the subject, the experience of the plant breeder speaks in unmistakable terms. It is certain that the possibilities of any given individual are predetermined before the birth of that individual. This is true of every living thing, be it plant or animal or man. But it is also true that

the hereditary possibilities of any individual will never become realities unless that individual is placed in a favorable environment.

Mr. Burbank might use the best possible judgment in mating his plants, and might select among the seedlings specimens for preservation with the nicest skill, without producing gratifying results, unless he supplied the right conditions of soil and culture.

And it is almost axiomatic to say that the same thing is true of the human plant. Place the child of the best heredity under conditions where it has poor food, bad air, and vicious companions, and its future may well be in doubt. Place the child of worst heredity in a favorable environment, and there may be good prospect of bringing out the better elements of its heritage, and suppressing the worst elements.

As a matter of course our detailed studies of heredity in the present series of monographs will give full recognition to this aspect of the subject, which is by no means its least important aspect.

Among the cognate topics that will demand full attention are the question of the transmissibility of various physical diseases; an inquiry as to the bearing of eugenics on romantic love; a detailed examination of the training of the normal and sub-normal child; studies of such social con-

ditions as mental abnormality and criminality with a view to suggestions as to the development of better brains for the race; an inquiry as to the possibility of adding years to our lives through personal hygiene; and finally an attempt to interpret the bearings of the new knowledge of heredity in its broadest relations on the question of the future of that great conglomerate galaxy of peoples—brought together from all quarters of the globe—which we speak of as the American race.

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